

loc. cit.), together with 5 more individuals reared since, we find that the old male no. 19 SB was undoubtedly $\frac{2}{3}$ WW $\frac{3}{4}$ N (W) and the female was the same; consequently all birds bred from this pair should be webbed in $\frac{2}{3}$ and a quarter of them webbed in $\frac{3}{4}$. As a matter of fact, out of 10 birds, 1 is normal in $\frac{2}{3}$, 3 are webbed in $\frac{3}{4}$, and one has all four toes fully webbed.

It is unnecessary, therefore, to follow up the matter further, as slight deviations appear in almost every mating.

We must, therefore, be driven back to the suggestion that a factor composed of two parts (cryptomeres), one of which is contained in each strain, causes the web to be suppressed or concealed.

On this assumption none of the results attained are at variance with the Mendelian theory. The proportions, however, do not fit in, but as the numbers are small this does not count for much. On the average the extent of the webbing shows a tendency to diminish and the foot to approximate to the normal as compared with birds of either of the pure strains, and in only one bird, bred in Exp. 9, has the web included the hallux.

Owing to lack of space and pressure of other experiments, I do not propose to pursue this inquiry further, but should anyone wish to follow it up I shall be very pleased to place all my material at his disposal.

My best thanks are due to Mr. Smalley, who has not only supplied me with full and accurate particulars from his pedigree book, but has also during the past year kept and bred many of the birds in his lofts.

2. Notes on the little-known Lizard *Lacerta jacksoni* Blgr., with Special Reference to its Cranial Characters. By EDWARD DEGEN, F.Z.S.

[Received September 15, 1910: Read November 15, 1910.]

(Text-figures 5-7.)

Through the kindness of Mr. G. A. Boulenger, F.R.S., V.P.Z.S., a series of seven specimens of *Lacerta jacksoni* has been placed in my hands for investigation. These specimens, recently procured by Mr. R. Kemp at Mumias, Mount Elgon District, British East Africa, at an altitude of 7000 feet, reached the British Museum in a bad state of preservation; opportunity was therefore taken to submit the cranial structure of this little-known species to a careful examination, the results of which are now placed on record.

Of the seven specimens six were males and one female.

The specimens from which the skulls were prepared were a small, but quite adult male, measuring 70 mm. from snout to vent, and the single female, measuring 68 mm. The dimensions

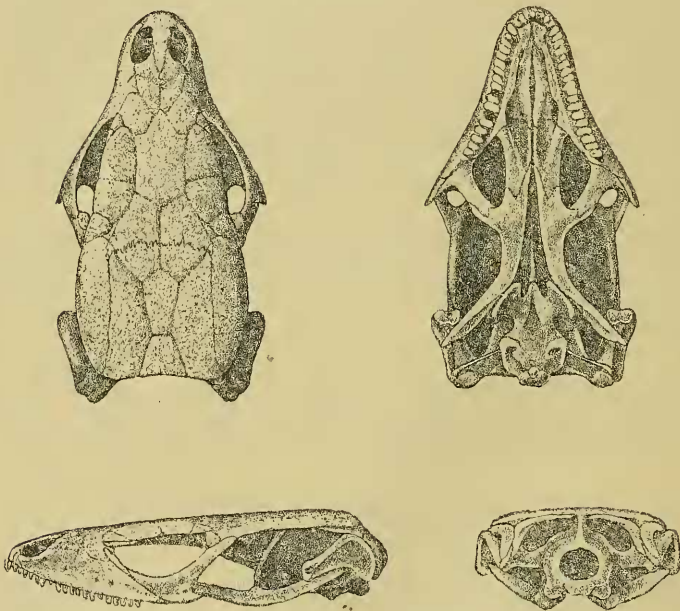
of the former therefore are about the same as those of the single male specimen from which the species was originally described and figured*, after its discovery at "Ravine Station," Mau Mountains, British East Africa, at an altitude similar to that at which the specimens now studied were obtained.

DESCRIPTION OF THE SKULL OF THE MALE.

DIMENSIONS.—Total length 21 mm.; width 12 mm. (as measured between the extreme points of the zygomatic processes of the jugular bones); height 6 mm.

Its width is therefore contained 1·9 times in its length, and its height 3·3 times.

Text-fig. 5.



Skull of male.

Upper, lower, lateral and posterior aspects. $\times 2\frac{1}{2}$.

GENERAL CONFIGURATION.—Remarkably depressed, as may be noted from its proportionate dimensions, and further seen in the above figure representing the profile.

Facial portion. Snout short, broadish at base, terminating in a bluntly rounded-off præmaxillary.

* "On New Lizards from the Interior of British East Africa," by G. A. Boulenger, F.R.S., Proc. Zool. Soc. 1899, pp. 96 & 97, pl. x.

CRANIUM (*Fronto-parietal portion*).—Squarish. The whole of the upper surface from the anterior borders of the nasals to the posterior margin of the parietal quite flat, and forming an almost perfectly level plane.

Dermal incrustation. Evenly spread, profuse, but highly porous, and covering the whole of the upper surface, including a small portion of the nasal process of the præmaxillary bone.

Lamina supraciliaris (text-fig. 6, A, p. 23) (Supra-orbital region). Completely ossified; 4 supraoculars, and 1 supraciliary on each side.

Supraorbital bones (text-fig. 6, B). Small; irregularly triangular and thickish, convex laterally. The internal angles terminating in a hook-like spine and the posterior margins irregularly serrated. Their lateral edges barely showing on the exterior and almost wholly concealed under the first supraciliary scutes.

Pterygoid bones. Toothless; moderately diverging immediately in front of the dilated lateral processes of the basisphenoid.

Postfrontals forming a single plate.

A *Retrociliary* present (text-fig. 6, A).

Dermal ossification of Temporal region. Supratemporalia 1 and 2 partially ossified.

Dentition. Number of teeth in præmaxillary 9; in each maxillary 18.

Nasal apertures (text-fig. 6, D). Subcircular, the longitudinal diameter the greater.

Parietal Region.—This, as in all Lacertidæ, is clearly defined in contour, and forms the greatest expanse of the cranial roof.

Its anterior borders practically are coincident with the fronto-parietal suture and the postorbital margins of the adjacent post-frontals. Posteriorly, the parietal is produced well backwards, and ends in a straight edge, the latter being the result of an increased deposit of the crusta calcarea—a feature mostly absent in the very young, in which this portion is concavely crescentic. This edge connects the two outward and backwardly directed processus parietales, spanning over the parotic processes, the processus ascendens of the supraoccipital bone, and covering the greater part of the latter in this species, so that the pars condyloidea of the occipital alone projects beyond it when the skull is viewed from above.

The parietal processes, slightly triangular in a transverse section at their terminal parts, are quite flat at their basal portions and are mere continuations of the median portions of the parietal itself. They have not, as is the case with the majority of the Wall-Lizards in which the facies cranialis is more elevated, the downwardly directed ridges set at right angles with their bases, in order to establish the contact with the underlying supraoccipital.

No *Foramen parietale*. (For special remarks on this striking feature refer to p. 29 at the end of the description of cranial characters.)

The *Postfrontals*, which are joined laterally to the single parietal bone by means of ordinary sutures, and which extend the whole length of the parietal as far backwards as the supratemporal bones, complete the cranial roof. They form a single plate in the present species, with every trace of their former sutures completely obliterated through fusion of the two component parts of which they consist in a great number of Lizards. This is a condition found to exist also in *Lacerta simonyi*, *L. atlantica*, *L. ocellata*, *L. viridis*, *L. galloti*, *L. dugesii*, and *L. levis* (in the latter species the squamosal also fuses with the postfrontal plate). In *Lacerta jacksoni* these bones are on the same horizontal plane with the parietal to their outermost margins, which in so many of the Lizards of the "*muralis*" group are strongly convex and appreciably bent downward towards the temporal foramen.

A similar feature, which imparts such a quadrangular aspect to this portion of the skull, is observable in the case of *Lacerta simonyi**, *L. atlantica*, *L. ocellata*, *L. viridis*, *L. galloti*, *L. dugesii*, *L. levis*, *Algiroides nigropunctatus*; and among *L. muralis* forms in the varieties *nigriventris* and *serpa*.

Frontal.—Originally paired (in very young specimens) it is single in the skull before me as well as in the majority of the members of this genus when adult. Its interorbital width, at the narrowest part of its anterior portion, measures exactly one-half of its posterior and widest portion, which is to be found in a line drawn between supraocularia 4, the latter coinciding approximately with the fronto-parietal suture. In proportion, therefore, this interorbital width is greater than in most of the *muralis*-like forms, except for the skull of a male specimen of the typical form from Vienna, which is also greatly depressed. In the length of the skull this dimension is contained six times; whereas in the majority of skulls belonging to the *muralis* group it varies between seven and eight times. It further equals the width of supraocularia 2 and 3; also that of the space between the inner dentary ridges (*laminae horizontales*) of the maxillary bones (measured across the *apertura narium interna*), and is of the same length exactly as the *columella cranii* (epipterygoid, Parker). Equally distinguished in respect to this broad interorbital diameter are—apart, again, from all the previously enumerated Atlantic Island forms and others named—the skulls of *L. agilis* and *levis*, and of the more typical *muralis* forms those of *L. chlorogaster*, *L. saxicola*, and *L. derjugini* †. Further, in *Algiroides nigropunctatus* this region is also of a broader type; but according to Siebenrock ‡ it differs in the persistence of the

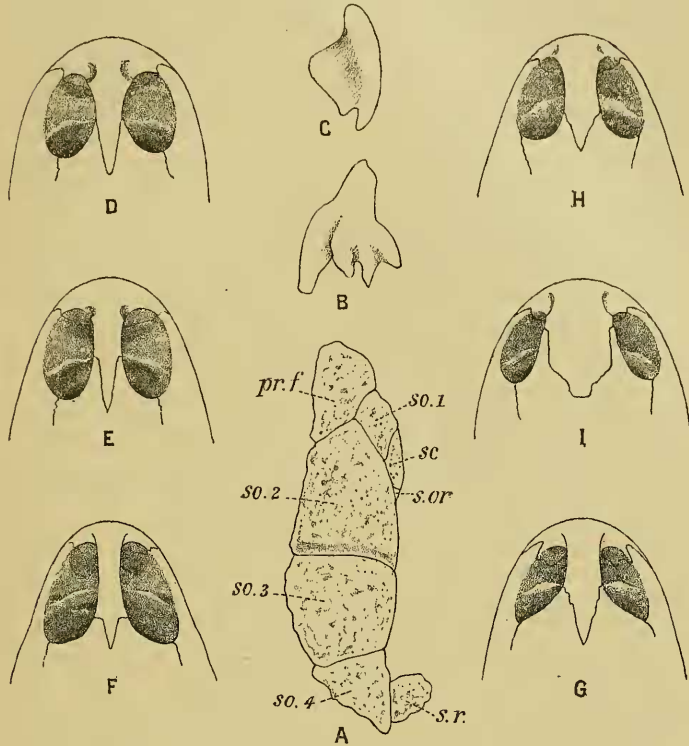
* Cf. "Das Skelet der *Lacerta simonyi* Steind. und der Lacertenfamilie überhaupt," von Friedrich Siebenrock, Sitzungsber. Kais. Akad. der Wissenschaften in Wien, vol. ciii. part i., April 1894, Taf. ii. figs. 8 & 11.

† Cfr. L. von Méhely, "Materialien zu einer Systematik und Phylogenie der Muralis-ähnlichen Lacerten," Ann. Mus. Nat. Hungarici, Band vii. 1909, tab. xix. fig. 9 & tab. xxii. figs. 3 & 5.

‡ L. c. p. 23.

two original parts composing the single frontal in the adult of this genus also*.

Text-fig. 6.



A. Lamina supraciliaris of *Lacerta jacksoni*, ♂. Right side.

B. Supraorbital bone of *L. jacksoni*, ♂. Right side, ventral aspect.

C. Supraorbital bone of *L. jacksoni*, ♀. Left side, ventral aspect.

D-I. Showing configuration of nasal process of præmaxillary and outer nasal apertures of—(D) *L. jacksoni*, ♂; (E) *L. jacksoni*, ♀; (F) *L. muralis*, f. *typica*, ♂, from Vienna; (G) *L. muralis*, f. *typica*, ♂, from Turin; (H) *L. vivipara*, ♂; (I) *L. agilis*, ♂. $\times 6\frac{1}{2}$.

pr.f., præfrontale; *so.*, scuta supraocularia (1-4); *sc.*, scutum supraciliare;
s.r., scutum retrociliare; *s.or.*, supraorbital.

Præmaxillary.—Its backwardly directed nasal process (text-fig. 6, D) is rather short and exceptionally broad at its base, where it is widely expanded on both sides, close behind the

* The skull of the male specimen of this species in the British Museum Collections does not bear out this statement, the said suture being wholly obliterated by incrustation.

laterally situated nerve-canals which at this point perforate the bone. Other examples of a very broad nasal process of the præmaxillary are to be found in *Lacerta ocellata*, *L. viridis*, *L. agilis* (text-fig. 6, I); and reference to Dr. Siebenrock's text and figures for *L. simonyi** also shows the latter to belong distinctly to the broad type, and consequently not—as he points out, when referring to this feature—being distinguished by a “long and slender” type of processus nasalis the same as in *Eremias arguta*, with which he likens *L. simonyi* as regards this character.

In *Lacerta dugesii* I find the shape of the nasal process occupies a position intermediate between *L. jacksoni*, the species here dealt with, and those possessing a nasal process of distinctly slender and elongate shape. Most of the true *muralis* forms belong to the latter (text-fig. 6, F & G). *Lacerta echinata*, *L. vivipara* (text-fig. 6, H), and *L. lævis* must also be considered intermediate forms in this respect. Allowance for individual variation, however, must be made, as the examination of three skulls of the latter species, all males, clearly demonstrates.

The very low angle at which this nasal process rises at its issue from the maxillary portion of the bone is merely due to the strongly depressed type of the skull itself, as, in fact, in any of the typically platycephalous forms, e. g. *L. mosorensis* or *L. oxycephala*, and differing from the more or less convex types of skulls in which this process is more highly arched.

Nasal bones.—Owing to the profuse incrustation of the upper surface of the skull, their contours in this specimen are very ill-defined. All that can be said on this head is that they are oblong, of a scaly nature, and that they widely diverge behind to receive between them the anterior and pointed processus nasalis of the frontal bone. Their length approximately equals their combined width at the widest part between the præfrontal bones.

The *Præfrontals* also appear very irregular in their upper outlines and in their relations to the maxillaries, the frontal, and the nasals. The spinous posterior process, which forms the anterior border of the margo supraorbitalis, seemingly does not reach much farther backward here than the suture between the first and the second supraorbitals.

The *Lacrymal* bones are clearly defined, exceedingly thin, narrow, and blade-like in shape. In their situation at the anterior angle of the orbital cavity, they form, together with the incisura lacrymalis of the præfrontals, a well-developed *foramen lacrymale*.

Jugulars.—Their zygomatic processes are represented by a rather short, but acutely pointed spine. Their temporal processes are somewhat straighter than is the case in Lizards having deeper skulls, in all of which they usually are of a more sigmoid form.

* *L. c.* p. 32, Taf. ii. fig. 8.

OCCIPITAL SEGMENT.—*Supraoccipital*. Its epiotic portion is nearly horizontal and only slightly inclines towards the posterior free edge, which forms the upper margin of the foramen magnum. The processus ascendens (processus spinosus, Clason) rises rather abruptly and almost vertically from the anterior portion of the supraoccipital, and constitutes the exclusive support of the parietal roof.

The processus ascendens is not flanked on either side by any apophysial eminence of the supraoccipital, which so frequently acquires the same height as does the spinous process itself, in order to increase the connecting-area with the parietal, such as is the case in *Lacerta oxycephala*, *L. saxicola*, *L. defilippi**, *L. chlorogaster* (boettgeri Méh.), and *L. mosorensis*, among some of the flat-headed species; or as in *Lacerta muralis* forma *typica*, the varieties *tiliguerta*, *campestris*, *nigriventris*, &c., as well as *Lacerta vivipara*, among the more highly and convexly-roofed forms where it also occurs.

A similar pillar arrangement as pointed out for *Lacerta jacksoni* is present also in *L. simonyi*, where it is carried out to even greater perfection owing to the increased elevation of the parietal roof †; in *L. galloti*, *L. viridis*, *L. dugesii*, and *L. echinata*, proportionate, of course, to their respective dimensions of height. This arrangement is of rare occurrence in a strongly depressed, practically platycephalous Lizard, and equally so in the case of the more pronounced pyramidocephalous forms, amongst which I find it occurs (in two specimens) in the varieties *serpa* and *lilfordi* only.

The *Basioccipital* ‡ and *Basisphenoid* § in no essential deviate in their configuration from the outlines usual in the genus for this region.

The *Parasphenoid* is feebly ossified at its base, whereas its centre remains cartilaginous.

The *Orbitosphenoid* bones have a broadish appearance on account of their reduced size, the latter being due to the depressed membranous portion of the cranium.

The *Squamosals*, usually slender and delicately shaped, which in so many of the smaller forms of *Lacerta* are only loosely connected by ligamentous tissue with the outer postfrontals, are here strongly developed and anteriorly quite fused to the latter. Their posterior ends, which articulate with the quadrates, are broadly expanded and, together with the parietal processes and the much reduced supratemporals which wedge themselves

* Cfr. Méhely, "Materialien etc.," Ann. Mus. Nat. Hung., Bd. vii. 1909, tab. xvi. fig. 6, tab. xix. figs. 3 & 10, tab. xxii. fig. 6.

† Cfr. Siebenrock, *l. c.* Taf. ii. fig. 9.

‡ Posteriorly and slightly in front of the foramen magnum there is a small tubercular process in the male specimen, which is absent in the female.

§ The foramen by which a branch of the jugular vein leaves the skull, and which Siebenrock (*l. c.* p. 11) regards as the result of synostosis of a special process with the anterior angle above it in the case of the Canary Island Lizards, but as absent in the European forms as well as in *L. dugesii*, is represented in *L. jacksoni* by ligament only.

between these two latero-posterior angles of the skull, unite with the processus parotici in such a way that the foramen supratemporale, conspicuous for its relative large size even in the adults of the pyramidocephalous forms like *Lacerta muralis* varieties *flumana*, *serpa*, *canpestris*, *pityusensis*, and others, is here nearly closed up as much, for instance, as in *L. laevis*.

The *Presphenoid*, which in some *Lacerte* is a slender ossification of the ethmoidal region in the membranous *septum orbitale*, is here reduced to a small cartilaginous band in which calcifications in the shape of granules are imbedded.

The *Columella cranii*, for a skull of the inferior dimensions of the present one, are exceptionally thick and strongly bent laterally—particularly so at their parietal ends, where they are in close contact with the *ala sphenoidea*. Thus they differ somewhat from the more delicate, either linear or slightly sigmoid thin structures frequently met with in the majority of other Wall-Lizards; but this condition is the rule in the very young, as already pointed out by Siebenrock*.

The *Quadrata* and *Ossa transversa* both answer to the general form of description for all these Lizards.

The *Vomer plates* are closely approximated to each other medially along their entire length, but intimately united only at their anterior ends. The lacuna pterygo-vomerina does not extend beyond the most posterior portion of the palate-bones, which latter also unite with each other along their greater length, producing the *crista vomerina* which is continued on to the palatines.

MANDIBLE.—This consists of five elements only, a condition stated by Leydig to be typical of the *Lacerta*, and further confirmed also by Siebenrock† in the fully adult *Lacerta atlantica*, *L. muralis* var. *melissellensis*, *L. caerulea*, *L. oxycephala*, and *L. mosorensis*, a condition brought about by the fusion of the supra-angulare with the articulare; whereas in *L. simonyi*, *ocellata*, *galloti*, and *viridis*‡, according to Siebenrock, these two bones remain separated throughout life.

The number of teeth in each ramus is 23.

DESCRIPTION OF THE SKULL OF THE FEMALE.

DIMENSIONS.—Length 15 mm.; width 9 mm.; height 4 mm.

Its width is therefore contained 1.6 times in its length, and its height 3.3 times.

GENERAL CONFIGURATION.—Strongly depressed in the same proportions as in the male.

In texture the bones are rather delicate, such as is characteristically the case in all platycephalous species of Lizards so

* *L. c.* p. 52.

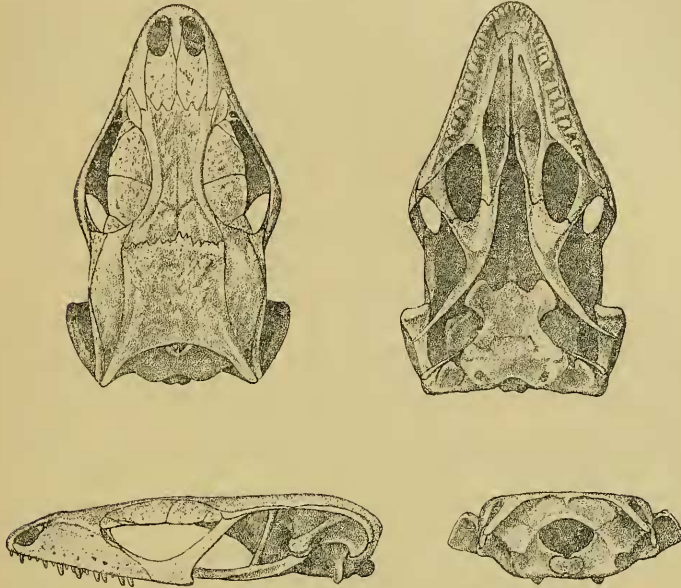
† *L. c.* p. 53.

‡ In the skull of a specimen of this species from Bozen, Tyrol, these two bones, though fused slightly, show their original longitudinal sutures in their anterior portions.

typically represented by *Lacerta mosorensis*, *oxycephala*, &c. Except for the bones composing the occipital segment, and the usually more massive præmaxillary and maxillaries, all the others assume a more or less foliated form.

Facial portion. The snout appears much shorter and broader than in the larger male, but is slightly more pointed in front.

Text-fig. 7.



Skull of female.

Upper, lower, lateral and posterior aspects. $\times 3\frac{1}{2}$.

CRANIUM (*Fronto-parietal region*).—Slightly broader than long in proportion, owing to the incomplete development of its posterior margin, which is crescentic in shape as in all young examples. Its median edge therefore barely reaches the anterior margin of the supraoccipital. The upper surface, quite horizontal in its main configuration, is longitudinally slightly undulated by alternately being concave in its fronto-nasal and fronto-parietal parts respectively, and convex in the intervening frontal and parietal areas.

Dermal incrustation. Very sparse and transparent. The sulci of the blood-vessels are sharply defined for their former ramifications.

Lamina supraciliaris. Completely ossified also, as in the male, and not bearing a trace of a membranous fontanelle.

Supraorbitals (text-fig. 6, C, p. 23). More regularly triangular than in the male, also slightly more massive. Their thickened and strongly convex lateral margins, scarcely exposed in the male, are here so to a greater extent on both sides (ascertained before accidental displacement of their dermal plates on one side in the later manipulation of the skull), having been covered partially only by the supraciliary.

Pterygoids. Diverging slightly more than in the male specimen. Teeth absent.

Postfrontals. Forming single plates also. Faint traces of an earlier existing suture, as recorded to exist in the very young stages of *Lacerta dugesii*, *ocellata*, and *muralis* by Siebenrock*, are discernible anteriorly only. In their posterior portions (postorbital margins) their fusion is complete.

A minutely developed *Retrociliary* present.

Dermal ossifications of Temporal region. I have been unable to find any.

Dentition. Number of teeth in præmaxillary 9, in each maxillary 15-16.

Nasal apertures (text-fig. 6, E). These are slightly narrower than in the male, and therefore longer in proportion.

Parietal Region.—Except for its morphogenetically inferior development of the posterior margin, which is a common feature of all the young, this does not deviate in any essential from the usual conditions. Its relation to the supracoccipital alone requires some explanation (see p. 29), which latter bone is, owing to the development stage, wholly exposed and not yet bridged over as it is in the male.

The *Foramen parietale* is absent, as in the male.

Frontal.—The median suture is discernible in its greater length, which is quite in accordance with the remarks already made on this subject. The width of the frontal at its narrowest point (between the margins orbitales) is equal to that of supraocular 3. The frontal is actually and relatively narrower than that of the male, its width being slightly less than half the length, and a seventh of the total length of the skull, whilst in the male the similar measurement shows that the frontal is relatively larger. The width of the female frontal is three-fourths of the length of the columella cranii, and in this measurement, as well as when it is compared with the width between the internal laminae horizontales (taken diagonally across the choanæ), the relative and actual inferiority of size as compared with the male is shown.

Præmaxillary (text-fig. 6, E).—The nasal process of this bone is on the whole longer and narrower than in the male. It also terminates posteriorly in a much more finely drawn-out point. It is quite devoid of any calcareous incrustation. Anteriorly it rises from the maxillary portion of the bone at a similar acute

* *L. c.* p. 75.

angle to its horizontal plane as in the male, but is less expanded at its base, immediately behind the constriction between the nerve-holes.

The *Nasal bones*, which, owing to extensive incrustation, in the male specimen were described as ill-defined, are here quite distinct in their entirety. Anteriorly their proximal processes, between which the nasal process of the præmaxillary is wedged, extend to the middle of the latter. Their lateral margins, shorter than those forming the median suture and moreover less decidedly linear, are parallel to each other. Their posterior edges, scale-like in shape, and imbricating in a similar manner on the frontals, are characteristic in having from 2 to 3 pointed lobes, of which the median ones are the longest, so as to become a fork into the prongs of which the median process of the frontal penetrates.

The *Prefrontals* also are more clearly defined in the female. They show their posterior frontal processes, which constitute the margo orbitalis anteriorly, to be spurs which extend nearly as far back as the suture between supraocularies 2 and 3.

The *Jugulars* do not differ from those of the male.

OCCIPITAL SEGMENT.—The *Supraoccipital* is united along its entire upper margin with the posterior edge of the parietal bone. The processus ascendens, so tolerably well developed and forming the sole support of the parietal in the male, is quite rudimentary here and reduced to a tubercle only. It is lower even than are the apophysial elevations of the epiotic portions of the bone, and, together with the epiphysial cartilaginous spine and a small portion of the membranous cranium, is laid bare and quite unprotected by the parietal. The sutures between the supraoccipital and the pleurooccipitals are perfectly distinct. The foramina retrofrontalia, in consequence of this extended transverse connection between the parietal and the supraoccipital, are more markedly reduced than in the male.

The *Basioccipital* and *Basisphenoid* are not fused as in the male, the suture between them showing distinctly (text-fig. 7, p. 27).

The *Squamosals* are flatter and less curved downwards than in the male.

The *Vomer plates* are more loosely united than in the male; but the *Palatines*, though more distinctly united, have their sagittal ridges imperfectly developed as compared with those of the male. The *sulci palatine* are also shallower in this skull.

MANDIBLE.—This consists of the six elements, of which each ramus is composed in all immature Lizards as pointed out by Siebenrock, the supra-angulare and articulare being not yet united by fusion.

On the Absence of the Foramen parietale.

After first ascribing the absence of the orifice for the pineal eye in the skull of the male to purely pathogenic causes, or to

a possibly individual aberration, both of these assumptions were dispelled on the discovery of this peculiarity in the female also.

An examination of the remaining five specimens preserved in alcohol, as well as of the type specimen referred to (*antea*, p. 20), and of a second female more recently described* (all in the Collection of the British Museum), readily confirmed its specific importance, since not one of them bore the least trace of the presence of this morphological feature.

Besides the simultaneous observation of its absence in *Zonosaurus madagascariensis*, belonging to the neighbouring family Gerrhosauridæ, a more methodical search among the rich material of the British Museum Collections revealed the following genera and species belonging to the family of Lacertidæ as being devoid also of the foramen parietale:—

<i>Poromera fordii</i> .	Benito River, Spanish Guinea.
<i>Lacerta echinata</i> .	Kribi River, Cameroon.
<i>Algiroides africanus</i> .	Uganda.
<i>Nucras delalandii</i> .	Natal.
<i>Latastia hardeggeri</i> .	Somaliland.
" <i>neumanni</i> .	Arabia.
" <i>degeni</i> .	Somaliland.
" <i>spinalis</i> .	"
" <i>phillipsii</i> .	"
<i>Gastropholis vittata</i> .	Zanzibar.
<i>Holaspis guentheri</i> .	Benito R., Spanish Guinea.

As the above list shows, cases of absence of the parietal foramen occur in several monotypic genera, also in the specifically numerous genus *Latastia* in no less than five species out of ten. Yet it is rather remarkable to find such a character restricted to two species only in a large genus such as *Lacerta*.

But more remarkable, perhaps, is the fact that all the forms thus deprived of the foramen belong to the African Continent, and that in the not strictly African genera it is restricted to African representatives.

Some of the remaining genera of this family, even of purely African habitat, do not contribute any specific forms which exhibit this negative character. It is curious to note, moreover, that among the upwards of thirty known species of the genus *Eremias*, about twenty of which are found in Africa, no exception to the presence of the parietal foramen could be found.

The sum total of cranial characters, as shown principally in the immature skull of the female, points to *Lacerta jacksoni* being

* G. A. Boulenger, "Ruwenzori Expedition Reports," Trans. Zool. Soc. vol. xix. part iii., Dec. 1909, p. 242.

closely allied to *L. muralis*, forma *typica*. It agrees with the latter as well as with *L. mosorensis* in the strongly depressed and more broadly expanded skull-structure in general. Also in the wider interorbital region, likewise a marked feature in *Lacerta vivipara*. Also in the mode in which the connection between the posterior portion of the parietal and that of the supraoccipital presents itself; in the absence of teeth on the pterygoid bones, and in the degree of divergence of these latter, as well as in the configuration of the basioccipital and the basisphenoid. Further, in the shortened muzzle with broadened base, and in the anteriorly broadened nasal process of the præmaxillary bone (text-fig. 6, D), well indicated in the typical form of *L. muralis* from Turin (text-fig. 6, G), but assuming its widest proportions in *Lacerta agilis* (text-fig. 6, I).

The total absence of supraocular fontanelles, notwithstanding the typically platycephalous structure, together with the ontogenetically early complete fusion to one composite plate of the postfrontals, would justify our referring this type of skull to the group of Lizards to which the term of Neolacertæ* has recently been given.

However, considering the views held and recently enunciated by writers on the subject of the phylogenetic relation of some of these characters, it is rather surprising to find undivided postfrontals also in species belonging to entirely different genera, such as *Eremias*, as Prof. v. Mähely† regards that genus as one of the prototypes of archæolacertic forms of this family because of the characters of its *lepidosis*.

I might add that in *Acanthodactylus boskianus*‡, a lizard to which Siebenrock§ ascribes a divided condition of the postfrontals, I find them to be completely fused into one plate in the skull of a female in the British Museum Collections.

A perfectly obliterated suture between the two postfrontals I also find in a female specimen of *Scapteira knowii*, another decidedly platycephalous species.

Thus, beyond some more or less doubtful points in regard to a satisfactory solution concerning the question of phylogeny, skulls of females do not seem to afford trustworthy indications from which to draw conclusions as to affinities. It is to that of the male, so far as an examination of the present limited material is concerned, that one must turn for better results.

As pointed out in the detailed part of the description, the tabular surface (inclusive of the postfrontals) is a very conspicuous feature of this male skull when taken in conjunction with the quadrangular and posteriorly well projecting parietal region. A near approach in this respect is to be found in a male specimen of *Lacerta muralis* of the variety *lilfordi*, a form restricted to

* L. v. Mähely, *Materialien*, 1. c.

† *Ib.*

‡ Sex not stated by Siebenrock.

§ Cf. "Das Skelet der *Lacerta simonyi*," Sitzb. Akad. Wiss. Wien, 1894, p. 37.

the Balearic Islands. Though unquestionably more pyramidocephalous in regard to its superstructure, it nevertheless holds a position somewhat intermediate between *L. jacksoni* and some of the more pronounced pyramidocephalous forms in this group in regard to this particular feature.

The variety *lilfordi* also shows the same exclusive pillar arrangement of the processus ascendens for sole support of the parietal roof, which is so prominent a feature also in all the larger forms of Lizards from the Atlantic Islands such as *L. simonyi*, *galloti*, *atlantica*, and also *L. dugesii** (except in regard to a modification in the basal portions of the parietal process), all differing by having pterygoid teeth, and all of which, except the latter, have strongly ossified temporal regions. These dermal ossifications in *Lacerta jacksoni*, as may have been seen, are present in a rudimentary state in two of the supratemporal scutes. Specimens of *Lacerta viridis*, *agilis*, and *laevis* may be quoted as further examples of characteristic forms in which the postfrontals are single plates, with perfectly analogous conditions in the relations between parietal and supraoccipital.

Also *Lacerta echinata*, from West Africa (except for its more elongate skull), in which the processus ascendens, typically pyramidal, does not enter into direct contact with the parietal, but is actually separated from it by confluence of the foramina retrofrontalia.

But it is the shape of the nasal process of the præmaxillary perhaps, as previously remarked on in the male, which may also provide a likely indication of closer affinity with some of the Lizards of the Canary Islands and the European species of *Lacerta*, viz. *ocellata*, *viridis*, and *agilis*—a character in which the Balearic variety *lilfordi* does not share, being distinguished by a narrower and very slender nasal process.

So far as the topography of the skull reveals phylogenetic affinity, it would appear that *Lacerta jacksoni* came from a Palæarctic stock, but also exhibits special relationships between the West African and Atlantic Island forms.

Remarks on Characters of Lepidosis in Lacerta jacksoni.

Dimensions.—In regard to size, five specimens, all of them males, are larger than the type of the species; the two biggest measuring 86 mm. from snout to vent, and consequently of about the same length as is the largest of the males of Dr. Peracca's series (consisting of seven specimens also), the length of which is given as 85.5 mm.

The male specimen, from which the skull was prepared for the

* Siebenrock (*vide l. c.* p. 36) includes this species amongst those having divided postfrontals. The specimens at my disposal, from the British Museum Collections, show them distinctly to be single plates, with no indication of former sutures.

foregoing description, measured 70 mm.; equal to the length of the type specimen. It is therefore only slightly longer than the skull of the female which was sacrificed for the same purpose, the length of the latter from snout to vent being 67 mm. Though differing by 3 mm. only, the sexual discrepancy in the size of the heads is a striking one: 19 mm. for the male against 14 mm. for the female.

Analogous specimens for size in Dr. Peracca's series show corresponding differences, viz. 20 mm. for the head of a male and 15.5 mm. for a female.

Ventral Plates.—The number of the ventral plate series varies in the Mount Elgon specimens, three of these having 6 longitudinal rows only and four of them having 8, which is the same as in the type of the species.

For the Turin Museum specimens their number is uniformly stated to be 6; but to judge from a footnote in connection with this point, the author was fully cognisant of the presence of supplementary series* for some of his specimens, but hesitated to accord them serial rank on account of the inferior size of the scutes which form the outermost rows.

In several of the Mount Elgon specimens these latter are sufficiently well developed to be considered as a series of ventrals.

Transversely, the minimum of the plates in the Elgon specimens is 23 in an adult male, and the maximum 26 respectively for the male and the female from which the skulls have been prepared.

For the Turin Museum series this minimum of 23 occurs in two males, one quite young and the other larger, whereas for the largest and fully adult the number is 24, but the highest figures of 27 and 28 are reached by two females of the same lot; the first number being identical with that of the Ruwenzori female in the British Museum Collections, whereas the female specimen from Mount Elgon has only 24 rows of these scutes.

It must be borne in mind that female lizards, having the body more elongate in proportion than the males, usually possess a higher number of transverse series of ventral plates.

Scales across the middle of the Body.—These range between 38 and 43, giving an average of about 40, the same as recorded for the type specimen, provided we except the male from which the skull was prepared and which showed the abnormally high number of 49. The Ruwenzori female has 37, a number close to the average of 36 as represented in the Turin Museum series, where they vary between 34 and 38, the latter figure being that also of *Lacerta vauereselli*, as well as constituting the minimum of the British Museum Elgon series of *Lacerta jacksoni*.

Supraciliary granules.—These vary in our specimens, both individually and for the two sides, between 3-3 and 6-5. They

* Cfr. Dott. M. G. Peracca. Il Ruwenzori, Relazioni Scientifiche, vol. i. Zoologia-Botanica: Rettili ed Anfibia, Lacertidæ, pp. 166 & 167.

are confined principally to the posterior portion of the supraocular region. In the Ruwenzori female they are reduced to 3 on the left and to 2 on the right side. Dr. Peracca describes these as "very irregular and asymmetrical for the two sides, except in a female in which the series is a complete one on the left, but totally absent on the right side." According to Tornier, who in his description omits to quote their number, the supraciliary series of granules is incomplete also in *Lacerta vauereselli*; but, as he says, confined to the posterior portion, agreeing therefore in this point also with *L. jacksoni*.

Gular Scales.—The number of scales between the third chin-plates and the collar-plates varies between 24 and 26 in the Elgon specimens except in one, in which there are 28. This is slightly in excess of the Duke of the Abruzzi's Expedition specimens, in which they are stated to be 22. In the type of the species their number is 25.

Femoral Pores.—Their number is fairly constant, with variations between 16 and 18 in the Elgon series. In one of the two females of the Turin Museum series there is a reduction to 15–14, otherwise 17–18 being the normal number. No case of supernumerary pores occurs in any of the British Museum specimens similar to the one female quoted in this respect by Dr. Peracca.

Upper Labials (anterior to the subocular).—Except for the head of the male, made into a skull, which on its left side showed these to be 5, their normal number throughout the remainder is 4. A male of Dr. Peracca's series shows a similar variation.

Postocular and Temporal Region.—In one of the specimens the last postocular scute is in contact with the first supratemporal, similar to what is found in *Lacerta mosorensis* as figured by Méhely*. In all others it is the upper postocular and the parietal scutes which meet, as in *Lacerta horvathi* Méh. or *L. muralis* typica †.

The 3 to 4 supratemporals are exceedingly small and narrow, the first and longest being partially supported proximally by the lateral margin of its underlying postfrontal bone, and therefore visible practically in its greatest extent when the head is viewed from above.

The number of scutes for the temporal region varies greatly. Those, for instance, forming the second row between the large subocular and the first supratemporal are: 3 for the left, and 5 for the right side in the male, the skull of which served for description.

Similar variation is to be found amongst the scutes in regard to their sculpture, which shows every gradation, from the perfectly smooth through the granular stage, as pointed out in Mr. Boulenger's description of the typical specimen ‡, to the faintly keeled or tubercular scutes to be met with in some of the Elgon

* *Cfr.* Ann. Mus. Nat. Hung. ii. 1904, p. 356, fig. 2, A, "Eine neue *Lacerta* aus Ungarn."

† *Ib.* fig. 2, B & C.

‡ *Cf.* G. A. Boulenger, Proc. Zool. Soc. 1899, p. 96.

specimens, a condition said by Tornier to exist also in his *Lacerta vauereselli*.

The suture between the first supraciliary and the second is slightly oblique.

The frontal shield, which also varies slightly in length, and which is especially short in some specimens, is on the whole shorter and broader than would appear from the figure on the plate accompanying the description of the type of the species. It was particularly broad in the male specimen which supplied the skull for description.

Colour-pattern and markings are quite uniform for the Elgon specimens, and identical with the type of the species. In their nearly fresh state of preservation their ventral sides were of a vivid yellow, which, since their preservation in alcohol, has changed into the whitish blue-grey described by Tornier in his *Lacerta vauereselli*, or the pale blue ascribed to the Ruwenzori female.

*Remarks on some of the supposed Specific Characters of
Lacerta vauereselli Tornier.*

On examination of specimens in a comparatively large series, as may have been seen from the foregoing, it appears that some of them are subject to individual variations.

This is particularly noticeable in the scaling of the temporal region, which was made one of the principal features by which to distinguish *Lacerta vauereselli* from *L. jacksoni*.

In the majority of specimens of the latter, these scales correspond with Dr. Tornier's description of them*, and a special note on this subject made on the male specimen—previous to resorting to the excision of the skull—was to the effect that these scales were considerably larger than those of the upper dorsals, being oblong, irregular in size, hexagonal to pentagonal in shape, feebly though distinctly keeled, and decidedly double the size of those situated immediately behind the auditory opening—all of these being the characteristics ascribed by Dr. Tornier to his *Lacerta vauereselli*, and which are also referred to by Mr. Boulenger † at the end of his description of the Ruwenzori female.

According to Dr. Tornier the collar is serrated. This, again, is a point not always easy of recognition, for some specimens show various degrees of unevenness in this respect.

The same remark applies to the number of plates forming the collar-edge, which are stated by Tornier to be 11. In the type of the species they are stated to be 10, which is the number also in one of the Elgon specimens; in the remainder of which, however, they range downward to from 9 to 7 only, thus showing considerable fluctuation. Peracca omits to quote their number.

* *Cfr.* Zool. Anzeiger. Bd. xxv., Oct. 1902. p. 702.

† "Ruwenzori Exped. Reports," Trans. Zool. Soc. vol. xix. part iii., Dec. 1909, p. 242.

Nor can I find any differences in the style of scaling of the upper dorsals between Dr. Tornier's diagnosis and that given for the type of the species by Mr. Boulenger, which scales, according to the latter, and further verified by myself, are stated to be "rhomboidal, keeled, juxtaposed, or subimbricate," every one of these conditions occurring in the Elgon specimens as well as in *Lacerta vaouereselli*.

The number of scales across the body, viz. 38 in the latter, also is in accord with the mean of the Elgon series of specimens; and, as regards the femoral pores, this has been finally disposed of, both by what has been made known (*antea*, p. 34), as well as by a remark made by Mr. Boulenger in connection with this point in his description of the Ruwenzori female.

As already pointed out in the diagnosis of the skull of *Lacerta jacksoni*, there are no teeth on the pterygoids any more than in *L. vaouereselli*. No difference appears to exist in regard to the supratemporals as described for this species by Dr. Tornier from their condition in the Elgon specimens, in all of which a small tympanic scute is plainly visible.

Neither is a distinct gular fold recognizable in all specimens, at least in the stricter sense, as it is often apparently absent in immature individuals, such as seems to be the case with Dr. Tornier's type, judging by the dimensions given by him—an assumption which is further corroborated by the fact that its sex has not been mentioned.

The length of the posterior extremity also varies greatly individually—in some Elgon examples it scarcely attains the axillary pit, whilst in others it reaches well beyond the collar-edge.

The geographical range of this species, so far as the increased, but at present still scanty, material on record permits one of judging (17 specimens, including Dr. Tornier's *L. vaouereselli*), appears to be a strictly equatorial one.

Its habitat, moreover, seems to be generally restricted to the mountainous region of that part of the Central African plateau, or immediately west of it, which culminates in its highest peaks, an area generally acquiring considerable altitude.

Its ultraplatycephalous shape, concurrently with its sombre-coloured garb, at once seems to denote a form occupying high ground, differing from those of the plains, with generally more massive skulls and more vividly contrasting colour-patterns, in the same manner as, for instance, *Lacerta mosorensis* differs from *Lacerta muralis* var. *campestris* or *serpa*, and *Lacerta muralis* var. *monticola* from the var. *bocagii*.